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MORBIDITY REPORTING IN LOCAL AREAS

I. Patterns of Reporting

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INTRODUCTION

Reporting of illness may be of public health importance for several reasons—to control the spread of disease, to aid the person suffering from a disease, to plan public health programs and to provide comprehensive information on the state of health of the population.

Health officers, epidemiologists and others using morbidity reports and statistics recognize that morbidity reporting at the present time has many defects, and falls short of meeting these objectives. The first problem here, is the measurement of the level of under-reporting (*1*).

In an initial effort to develop methods for the evaluation of morbidity reporting, and to develop recommendations for desirable requirements and procedures, studies have been made in five local areas presenting a variety of reporting problems. These studies, undertaken cooperatively with State and local health departments, covered sources of reporting, types of data collected, and supplemental source material available locally on unreported cases.

Basic to an evaluation of reporting is an understanding of the patterns of reporting in local health departments—the sources of reports, types of diagnoses, and the time elapsed between the onset of cases and their report to the health department. This paper will be limited to a discussion of these aspects of reporting. Supplemental source material and methods of evaluating completeness of reporting will be reviewed in subsequent papers.

MATERIAL

During the calendar year 1944 and 6 to 8 months of 1945, studies were undertaken in five areas representing widely varying population densities and types of health department organization. The areas

[1] From the Division of Public Health Methods.

ranged from a metropolitan area with a large and efficient health department and a well-integrated organization for the collection and

Area	Type	Estimated population (1943)
A	Urban	930,000
B	do	101,000
C	Urban and rural	70,000
D	do	63,000
E	Primarily rural	125,000

analysis of morbidity reports to a rural county with a number of part-time health officers (only one of whom was a physician) and with one clerk who combined for two counties the function of administrator, secretary, and statistical staff.

The 1945 study covered all reportable diseases (except venereal diseases) in all areas for the 6- to 8-month period. The exception was in area A where, because of the volume of reports, the study of German measles, chickenpox, and of mumps in children under 16 was limited to 7 weeks.

The 1944 study covered all reportable diseases (except venereal diseases) in areas C, D, and E. In area A, because of the volume of reports, it was limited to diphtheria, poliomyelitis, meningitis, pneumonia and rheumatic fever. Records on measles and whooping cough were not available for 1944 in area B.

Table 1 summarizes, by area, the number and diagnoses of cases reported by the local health department to the State in the 2 calendar years and the number of cases covered in the sample. The sample was not large enough to give significant information on infrequently occurring diseases. Furthermore, because of such factors as the epidemicity of certain diseases and the unavailability of certain records, the proportion of cases sampled varied greatly among diseases. Detailed discussion, therefore, has been limited to chickenpox, diphtheria, measles, meningitis, mumps, pneumonia, poliomyelitis, rheumatic fever, scarlet fever, tuberculosis, and whooping cough.

METHOD OF STUDY

After preliminary planning conferences with cooperating local organizations, a statistical clerk or medical record librarian was assigned, early in 1945, to the local health department in each of the five areas. Information recorded for each case covered the diagnosis, the source or sources which reported the case, the dates of the reports, laboratory diagnostic procedures employed, medical care and hospitalization received, as well as the age, sex, and residence of the patient.

To supplement this material similar data were secured from hospitals, schools, industrial plants, visiting nurse associations, Selective

TABLE 1.—*Reported cases of communicable diseases in five study areas, morbidity*

TABLE 1.—*Reported cases of communicable diseases in five study areas, morbidity reporting study, 1944 and 1945*

Disease	Area A			Area B			Area C			Area D			Area E		
	Total cases reported	Sample		Total cases reported	Sample		Total cases reported	Sample		Total cases reported	Sample		Total cases reported	Sample	
		Number of cases	Percent of total		Number of cases	Percent of total		Number of cases	Percent of total		Number of cases	Percent of total		Number of cases	Percent of total
Total	38,489	8,860		4,307	650		831	705		792	511		2,201	1,961	
Chickenpox	6,070	798	13	NR			72	55	76	45	30	67	779	700	90
Diphtheria	614	433	71	37	28	76	2	2	100	14	2	14	10	8	80
Dysentery	84	9	11				2	1	50						
Encephalitis	1	1	100				2	2	100						
German measles	564	109	19	NR			2	2	100				8	7	88
Influenza	365	14	4				69	38	55				2	2	100
Malaria	14	0	0	1	1	100	45	19	42						
Measles	10,530	147	1	2,907	7	(1)	149	142	95	136	122	90	258	256	99
Meningitis, meningococcus	232	213	92	20	13	65	8	8	100	12	11	92	24	22	92
Mumps	3,632	662	18	NR			19	13	68	19	19	100	493	456	92
Pneumonia	2,734	1,985	73	NR			114	114	100				29	27	93
Poliomyelitis	217	207	95	33	33	100	9	9	100	4	3	75	23	22	96
Rabies							1	1	100						
Rheumatic fever	351	312	89	NR			6	6	100	NR			1	1	100
Rocky Mountain spotted fever	3	1	33										8	7	88
Scarlet fever	4,499	1,400	31	126	84	67	149	131	88	309	174	56	293	269	92
Streptococcic sore throat	126	21	17				15	13	87	1	1	100			
Trachoma							1	1	100						
Trichinosis	3	2	67												
Tuberculosis	3,840	1,141	30	130	102	78	104	101	97	73	59	81	78	65	83
Tularemia	2	1	50				4	3	75						
Typhoid fever	26	22	85	4	3	75	4	4	100	12	11	92	9	8	89
Typhus fever	10	0	0	14	11	79									
Undulant fever	2	1	50	4	4	100	8	8	100	4	4	100	12	11	92
Vincent's angina	49	0	0				4	2	50						
Whooping cough	4,521	1,381	31	1,031	364	35	42	30	71	22	7	32	174	100	57

NR—Not reportable.
[1] Less than 0.5 percent.

TABLE 2.—*Total cases and percent reported by each source, 1944 and 1945 study period*

Reporting source	Disease (percent reported by each source)[1]										
	Chickenpox	Diphtheria	Measles	Meningitis, men.	Mumps	Pneumonia	Poliomyelitis	Rheumatic fever	Scarlet fever	Tuberculosis	Whooping cough
AREA A											
Number of cases	798	433	147	213	662	1,985	207	312	1,400	1,141	1,381
Private physician	44	24	71	7	89	16	27	5	87	26	46
Hospital[2]	4	8	7	31	9	46	8	83	7	21	20
Health department:											
Nurse	51	(3)	22	(3)	1	.....	.....	.....	8	(3)	37
Other personnel	(3)	1	9	.....	(3)	.....	.....	10	4	.....	14
Clinic	.....	.....	.....	.....	.....	1	.....	(3)	(3)	28	.....
Laboratory	.....	36	(3)	.....	.....	4	.....	.....	1	5	(3)
Communicable disease hospital	1	73	1	58	1	2	80	3	3	(3)	5
Mass survey	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	.....
Death certificate	.....	3	.....	13	.....	35	(3)	(3)	.....	6	(3)
School	1	.....	1	1	(3)	.....	.....	.....	(3)	.....	1
Householder	1	.....	1	.....	.....	.....	.....	.....	1	(3)	2
Other	(3)	.....	3	.....	.....	(3)	.....	(3)	(3)	10	1
AREA B											
Number of cases	NR	28	7	13	NR	NR	33	NR	84	102	364
Private physician	.....	79	57	85	.....	.....	88	.....	69	11	9
Hospital	.....	4	.....	15	.....	.....	33	.....	.....	58	(3)
Health department:											
Nurse	.....	.....	.....	.....	.....	.....	3	.....	.....	1	16
Other personnel	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....
Clinic	.....	.....	.....	.....	.....	.....	.....	.....	.....	32	.....
School	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Householder	.....	21	57	8	.....	.....	6	.....	40	.....	74
Other	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
AREA C											
Number of cases	55	2	142	8	13	114	9	6	131	101	30
Private physician	98	100	100	62	100	67	89	17	99	67	100
Health Department:											
Nurse	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Laboratory	.....	50	.....	.....	.....	4	.....	17	5	10	.....
Death certificate	2	.....	.....	50	.....	48	11	83	.....	48	.....
Other	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....
AREA D											
Number of cases	30	2	122	11	19	68	3	NR	174	59	7
Private physician	97	100	98	91	95	100	100	.....	100	29	100
Hospital	3	.....	.....	18	.....	.....	.....	.....	.....	.....	.....
Health department:											
Nurse	3	.....	2	.....	5	.....	.....	.....	1	.....	.....
Other personnel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clinic	.....	.....	.....	.....	.....	.....	.....	.....	.....	59	.....
Mass survey	.....	.....	.....	.....	.....	.....	.....	.....	.....	27	.....
Death certificate	.....	.....	.....	18	.....	.....	.....	.....	.....	.....	.....
Other	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....
AREA E											
Number of cases	700	8	256	22	456	27	22	1	269	65	100
Private physicians	48	100	56	86	36	78	95	100	92	14	72
Hospital	.....	.....	.....	9	.....	30	.....	.....	.....	8	.....
Health department:											
Other personnel	5	.....	2	5	2	4	.....	.....	3	.....	11
Clinic	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	.....
School	25	.....	38	.....	59	.....	.....	.....	3	.....	14
Institution	.....	.....	.....	.....	.....	.....	.....	.....	.....	54	.....
Householder	23	.....	4	.....	4	.....	.....	.....	4	.....	3
Other	.....	.....	.....	.....	.....	.....	5	.....	.....	5	.....

[1] Since one case may be reported by two or more sources, these figures may add to more than 100 percent.
[2] Exclusive of communicable disease hospital operated by health department.
[3] Less than 0.5 percent. NR—Not reportable.

Service, and welfare agencies. Data recorded through these channels were matched with health department data on reported cases, so that all information on each case was combined.

SOURCE OF REPORTS

Traditionally, health departments learn of the existence of a case of a notifiable disease from a report made by a physician to the health officer. All of the States included in the study require physicians, hospitals, householders, school teachers to report cases of notifiable diseases. In addition, certain of the areas require reporting by nurses and by persons in charge of food handling establishments, boarding houses, hotels, and institutions.

In practice, however, channels were found to be used only as the local health department encouraged and stimulated their use. The important sources of reporting, in the areas studied, were five—physicians, hospitals, schools, householders, and the health department itself. Four patterns were found in the five areas—with principal reporting by:

(1) Physicians (areas C and D),
(2) Physicians and schools (area E),
(3) Householders and physicians (area B),
(4) Physicians and health department (area A).

Figure 1 indicates the sources of reports in each of the study areas, adjusted for the sample, for all and for selected diseases. Table 2 shows the source of reports from each area for the diseases most frequently reported.

Physicians were the most important source of reports in four of the study areas. They constituted a secondary source only in area B.

Hospitals were an integral part of the reporting system only in area A, where several of the largest hospitals routinely reported through the hospital record room. Other hospitals in the area reported less frequently. In area B, reporting of poliomyelitis by the hopital was required. In the other areas only occasional reports were received from hospitals.

Schools were used as a reporting source only in area E and only in certain parts of that county. These reports with few exceptions represented a group of children for whom no physician reports were made. In this county 25 percent of the cases of chickenpox, 59 percent of mumps, and 38 percent of measles were reported by schools. A few cases of whooping cough and scarlet fever also were reported.

In areas A and B, the health department nurses secured information in the course of their visits to the schools, and school reporting is included in the nurses' reports.

Householders were the most important reporting source in area B, where the physicians frequently depended on householders to report

to the health department for them. In other areas, only scattered reports were secured from householders.

The health department itself was found to take a very active part in the finding of cases only in area A—through follow-up of suspects and contacts by nurses or other staff members, through medical or laboratory diagnostic service, through well-baby, tuberculosis, and other clinics, through school health service, through mass case finding, and through checking death certificates.

Health officers came into the reporting picture in only two of the study areas. In area A, the health officer or an assistant visited 4 percent of the reported cases, usually as diagnostician. In area E, reports from physicians, schools, or householders were made through local sanitarians, or health officers, to the district (two-county) health department.

The health department nursing staff did some case finding and reporting in all areas. In area A, nurses made original reports on secondary cases of chickenpox, measles, whooping cough, and scarlet fever. In area B they made home follow-ups on many of the cases reported by householders, and reported a fair proportion of the whooping cough cases.

At the other extreme, in area E, the only nursing reports were made through the tuberculosis clinics, and nursing activity was limited almost entirely to tuberculosis and venereal disease control.

All areas but area C reported some cases through health department clinics. Two areas found cases through laboratory diagnostic service. The communicable disease hospital in area A which was under the direction of the health department routinely reported all cases admitted.

Many of the reported tuberculosis cases were found through mass surveys in areas A and D.

Death certificates were routinely used to find cases in areas A and C. Through this channel, cases of poliomyelitis, meningitis, pneumonia, tuberculosis, and rheumatic fever were reported. No case-finding check of vital records was made in area B. In area E, the local health department never saw a death record, since in that State vital records were sent from the local registrar direct to the State health department.

SOURCE OF SPECIFIC DISEASE REPORTS

In spite of the variation of reporting patterns among the study areas, typical patterns were found for individual diseases. Figure 1 indicates such patterns for the total and for four representative diseases.

Scarlet fever was reported almost entirely by private physicians.

Poliomyelitis, and meningococcus meningitis were reported prima-

rily by physicians, with hospitals and death certificates as other important sources.

During the study period a regulation was adopted in area B requiring that physicians secure permission from the health department before a case of poliomyelitis could be hospitalized and that the hospital report the admission of such cases.

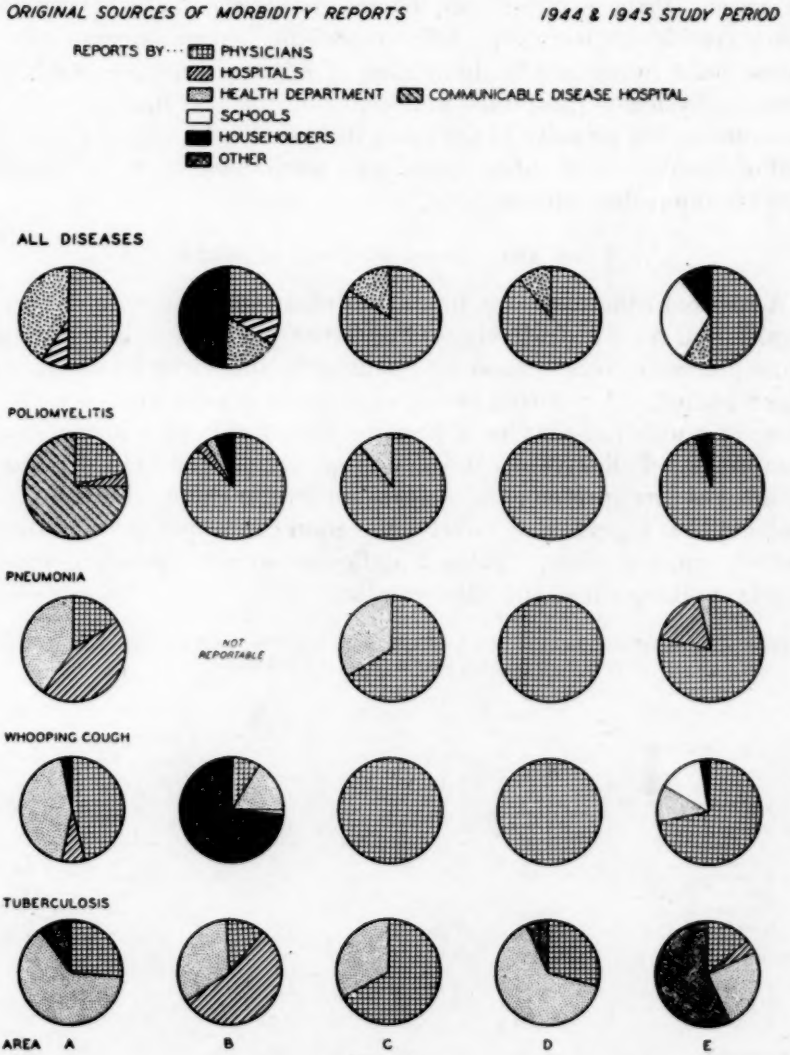

FIGURE 1.

Pneumonia and rheumatic fever, notifiable only in areas A, C, and E, were reported primarily by physician, hospital, and death certificate.

Diphtheria was reported primarily by private physicians, with laboratories, the communicable disease hospitals, and householders as supplementary sources.

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Chickenpox, mumps, measles, and whooping cough were reported principally by private physicians, but health department nurses, schools, and householders were each important supplemental reporting sources. Chickenpox and mumps had been removed from the reportable list in area B shortly before the beginning of this study.

Tuberculosis reports came from the greatest variety of sources in all areas. Private physicians, clinics, hospitals, mass surveys and death certificates were especially important. Mass surveys were of course most important in the finding of minimal inactive cases, with clinics, physicians, hospitals, and death certificates increasing in importance as the severity of the cases increased. In area E more than half of the reports of tuberculosis cases were made by a large institution for the feeble-minded.

TYPE AND STAGE DISEASE REPORTED

A marked difference was found in definitions of certain diseases—legally and administratively. Only lobar pneumonia is reported in some places; in others broncho-pneumonia and virus pneumonia are also reported. A reported case of diphtheria in some areas is a clinical case; in another it may be a positive throat culture with no clinical symptoms. Poliomyelitis in some areas is reported only if paralytic symptoms are present, in others reports include abortive cases. Tuberculosis reports may cover reinfection cases only, or may include healed primary cases. Table 3 indicates such variations for pneumonia, poliomyelitis, and tuberculosis.

TABLE 3.—*Reported cases of pneumonia, poliomyelitis, and tuberculosis, by type or stage, 1944 and 1945 study period*

Diagnosis	Area A		Area B		Area C		Area D		Area E	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Pneumonia	1,985	100	NR	.....	114	100	NR	.....	27	100
Lobar	919	46	.....	.....	40	35	.....	.....	11	39
Broncho	482	24	.....	.....	39	34	.....	.....	5	19
Atypical (virus)	8	1	.....	.....	4	4	.....	.....	3	11
Hypostatic	.....	.....	.....	.....	7	6	.....	.....	.....	.....
Unspecified	576	29	.....	.....	24	21	.....	.....	8	31
Poliomyelitis	207	100	33	100	9	100	3	100	22	100
Paralytic	8	4	20	61	.....	.....	.....	.....	13	59
Nonparalytic	30	15	4	13	.....	.....	.....	.....	3	14
Unspecified	169	81	9	26	9	100	3	100	6	27
Tuberculosis	1,141	100	102	100	101	100	59	100	65	100
Reinfection—respiratory:										
Minimal inactive	351	31	1	1	2	2	24	40	1	2
Minimal active	136	12	12	12	5	5	10	17	4	6
Mod. advanced	254	22	23	22	.....	.....	13	22	6	9
Far advanced	221	19	53	52	1	1	4	7	11	17
Pleural effusion only	29	3	.....	.....	2	2	.....	.....	.....	.....
Other type	51	5	.....	.....	4	4	.....	.....	2	3
Primary	70	6	1	1	.....	.....	5	9	.....	.....
Unspecified	29	2	12	12	87	86	3	5	41	63

NR—Not reportable.

MEDICAL AND NONMEDICAL DIAGNOSES

Morbidity reporting at best can cover only diagnosed cases of the disease. This study has demonstrated much variation in the interpretation of the word "diagnosed." One health jurisdiction may consider only a report signed by a physician as evidence of a diagnosed case. Another jurisdiction may accept nonmedical diagnoses on secondary cases in a household, if a medical diagnosis has been recorded for the first case. Still another will accept reports from householders or from school principals. In the latter instance, the physician may have told the mother who told the teacher who told the school nurse, or the case may never have been seen by a physician.

In areas A, C, and D, almost all reports were made by physicians or hospitals (table 4). In area E, which encouraged reporting by school authorities, only about half of the cases were reported by physicians or hospitals.

In area B, which encouraged reporting by householders, only about one-quarter of all cases were reported by physicians or hospitals.

TABLE 4.—*Type of morbidity report, 5 study areas, 1944–45*

Type of reports	Area				
	A	B	C	D	E
	Percent				
All reports	100	100	100	100	100
Medical	89	28	99	96	55
Nonmedical:					
With record of medical attendance	1	37	1	2	5
Without record of medical attendance	10	35	0	2	40

The nonmedical report of a disease in general was found to be most frequent for the two childhood diseases with a typical rash—chickenpox and measles—and somewhat less frequent for mumps and whooping cough. It was found very infrequently for the major diseases.

REPORTING LAG

Morbidity reports are published by the Public Health Service and often by the States, as cases reported, and therefore presumably occurrring, during a given week. There is a tendency to take the dates of published reports at their face value or to assume that the time between the date of report and of publication is a constant.

It was found, however, that neither of these assumptions is safe. Considerable time was often found to elapse between the onset or first symptoms of a disease, the calling of a physician, the establishment of a diagnosis, the filling out and mailing of a report card, and the tabulation of the reported data. Furthermore, this lag was far from constant. Great variation existed, both by area and by disease,

in the time which elapsed between the onset of a case and the date on which it was reported.

While this variation in lag was obvious throughout the study, it was impossible to measure its exact extent because of gaps and omissions in local records. In some cases, information was available as to date of onset; in others, only to the physician's first visit. But the data available did indicate that the variations in reporting lag are important and need to be taken into account in interpreting published morbidity reports.

In general, reports were transmitted most quickly in area B, where the householder usually initiated the reporting. Second in order of promptness was area A, where the health department took considerable initiative in case finding.

In all areas, however, diseases with sudden onset and easily recognizable symptoms—scarlet fever, measles, chickenpox, diphtheria—were reported to the local health department relatively promptly, usually within a week after the onset. The less readily diagnosed whooping cough was usually reported during the second week of the case.

For pneumonia, the average case was reported during the 3d week in each of the three areas.

Table 5 summarizes the findings on reporting lags. In area B reports on scarlet fever, measles, and diphtheria were current reports. In the other study areas most reports on these diseases were for cases occurring a week earlier. Reports on whooping cough usually represented cases for the second previous week, while reports on pneumonia represented cases occurring during the third previous week.

TABLE 5.—*Average number of days elapsed between onset (or physician's first visit) and date case was reported to the State health department, 5 study areas, 1944–45*

Disease	Area				
	A	B	C	D	E
	Average number of days				
Scarlet fever	6.0	2.8	7.4	7.8	6.7
Measles	6.2	3.7	6.9	11.2	13.1
Chickenpox	8.3	----	8.6	22.4	10.9
Diphtheria	8.5	3.9	7.0	7.0	6.7
Whooping cough	12.0	10.3	32.4	12.0	18.2
Pneumonia	16.4	----	16.5	----	17.7

SUMMARY

A study of morbidity reporting in five local areas revealed great variations in patterns. While physicians were the most important, and in some areas almost the only, reporting source it was found that in other areas hospitals, schools, householders, and health department staff members also were important reporting sources.

Within the pattern for each area there was considerable variation in the reporting sources for different types of diseases. Some diseases, particularly scarlet fever, were reported almost entirely by physicians. Reporting from other sources was most important for tuberculosis.

Two of the areas used only reports of cases diagnosed by physicians; the others received reports from a variety of sources. These differences existed both because of differing regulations and definitions as to what constitutes a report, and because of the policy and efforts of the health department in stimulating reporting from collateral sources.

The average lag between the onset of a case of a reportable disease and the report of that case to the State health department was found to vary considerably among areas and among diseases.

All of these differences in the pattern of reporting affect the comparability of the data at the State or national level. It also is evident that they are related to the completeness of reporting. It is planned to discuss these relationships and to develop indices of the completeness of reporting in subsequent papers.

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FIELD TESTS WITH TICK REPELLENTS [1]

By James M. Brennan, *Entomologist, United States Public Health Service*

The results of preliminary laboratory tests of certain organic materials as tick repellents were published in the PUBLIC HEALTH REPORTS, August 8, 1947. Those which showed most promise and were available in sufficient quantity (N-n-butylacetanilide, 1-benzyl cyclohexanol-1, 2-phenyl cyclohexanol, benzyl benzoate, dimethyl phthalate, dibutyl phthalate, 6–2–2 mixture, and phthalic acid-hexahydro-diethyl ester) have subsequently been tested under field conditions, with Army cooperation, at Camp Bullis, Tex., June 1947.

[1] From the Rocky Mountain Laboratory (Hamilton, Montana), of the Division of Infectious Diseases, National Institute of Health.

This area was selected because of the local abundance of the lone star tick, *Amblyomma americanum*.[2]

Enlisted men from the 32d Medical Battalion, Brooke Army Medical Center, Fort Sam Houston, Tex., served as test subjects. Except for a few key men, it was not possible to retain the same personnel throughout the entire 4 weeks of observations, which made frequent replacements necessary.

The data obtained concerned only nymphal and adult ticks, since the larvae were not sufficiently prevalent to provide significant information. Two series of tests were performed.

TEST PROCEDURES

In the first series of tests, 20 men wearing treated and untreated regulation fatigue uniforms were exposed to heavy tick infestations for approximately 4 hours per day. Sixteen uniforms were treated in pairs, each pair with a different repellent, while four were left untreated as controls. Freshly laundered garments were impregnated, once only, from a solvent (acetone) with 2 ounces of repellent per uniform. Since trousers were tucked in combat boots, socks were untreated. For obvious reasons the test subjects were not told which uniforms were treated and which were untreated.

The repellents were evaluated by comparing the numbers of ticks on treated and untreated uniforms. The ticks were removed and counted hourly. Percent repellency was derived from the reduction in the average number of ticks recorded on treated clothing per man per day below the average number on untreated clothing, and may be expressed by the equation $R=\frac{U-T}{U} \times 100$, where R=percent repellency, U=number of ticks on untreated clothing, and T=number of ticks on treated clothing.

Test clothing was worn for approximately 8 hours daily, and when not in use was folded or rolled and stored in the laboratory. Requirements exacted from the test subjects were that underwear, at least shorts, must be worn; that they be exposed to the greatest possible

[2] The project at Camp Bullis, approved by Gen. Jonathan M. Wainwright, commanding, Fourth Army, was conducted with the aid of various military organizations at Fort Sam Houston.

Experiments were performed with the technical assistance of First Lt. Herbert C. Barnett, Medical Field Service School, through the cooperation of his commanding officer, Lt. Col. Gottlieb L. Orth.

The author is indebted to Brig. Gen. John W. Willis, commanding, Brooke Army Medical Center, and Col. E. H. Gist, post surgeon, for the many courtesies extended and facilities provided; to the Dow Chemical Co. for N-n-butylacetanilide and 2-phenyl cyclohexanol; to the Monsanto Chemical Co. for dibutyl phthalate; to the Army Chemical Corps for benzyl benzoate and 1-benzyl cyclohexanol-1, the latter having been synthesized especially for this purpose; to the laboratory of the United States Bureau of Entomology and Plant Quarantine, Orlando, Fla., for phthalic acid-hexahydro-diethyl ester; and to the Chemical-Biological Coordination Center of the National Research Council for much valuable assistance in the procurement of many materials which were used in these and initial screening tests.

The writer is particularly grateful to the enlisted men of the 32d Medical Battalion, who exposed themselves to ticks.

number of ticks during a 4-hour test period; and that no ticks be removed from their persons except under supervision. No restrictions were placed on their activities. They were at liberty to move about, sit, or recline. Card playing and reading were encouraged.

The second series of tests was, in substance, a repetition of the first, except that a comparison was made of dosages of 1 and 2 ounces per uniform and fewer materials were tested. Twenty uniforms were impregnated in lots of four, each lot with a different repellent, half with 2 ounces and half with 1 ounce, while five were left untreated as controls. To avoid dissatisfaction among the men and to minimize inconsistencies in test data, untreated uniforms were rotated so that each man wore an untreated uniform every fifth day.

TEST DATA

The data for the two series of tests are given in tables 1 and 2, respectively.

As might be expected, under conditions involving variables which could not be eliminated, the results of the tests were not wholly consistent, but none the less were strongly indicative of the relative repellent value of the various materials. While the effectiveness of all test materials was reduced (tables 1 and 2) as a result of aging, wear and other factors influencing their chemical breakdown, this reduction was not constant. Similarly, the difference in the degree of protection from nymphs and adults and at dosages of 1 and 2 ounces, while perceptible, was not constant.

In evaluating the tabular data, the daily fluctuation in the average number of ticks recorded on untreated uniforms is to be considered. This count averaged lower and was more erratic in the first series of tests than in the second, therefore it is believed that the data in table 2 are somewhat more significant.

In the first series no records were obtained for 6–2–2 and dibutyl phthalate on the fourth day because the full complement of men was not present, and in the second series the observations on 6–2–2 and benzyl benzoate were discontinued after the fifth day, both because of their erratic performance and the desire to give more attention to the effects of wear on the chemicals which appeared more promising.

Only two compounds, butylacetanilide and phthalic acid-hexahydrodiethyl ester afforded complete protection against both nymphal and adult ticks on the first day after impregnation in the first series, and only the former on any subsequent days in both series. While none of the materials at a dosage of 1 ounce gave complete protection from both nymphs and adults, butylacetanilide, benzyl cyclohexanol and phenyl cyclohexanol did give a high degree of protection (more than 90 percent) on several different days (table 2).

TABLE 1.—*Percent repellency to* Amblyomma americanum *of materials tested at a dosage of 2 ounces per uniform*

Test days (by number of day after treatment)	N-n-butyl-acetanilide		1-Benzyl cyclo-hexanol-1		2-Phenyl cyclo-hexanol		Benzyl benzoate		6-2-2 mixture		Dibutyl phthalate		Dimethyl phthalate		Phthalic acid-hexahydro-diethyl ester		Control: Average ticks per man on untreated uniforms	
	Percent repellency																	
	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs
1st	100	100	50	100	80	91	80	91	60	95	100	95	50	82	100	100	5	11
2d	94	93	88	97	58	65	44	79	40	81	35	47	83	89	98	99	26	98
3d	91	89	95	100	98	97	84	75	61	55	0	69	91	80	69	87	32	75
4th	100	100	88	91	0	45	69	92					81	79	6	0	8	98
7th	82	94	68	57	0	0	36	77	50	44	0	73	18	69	36	62	11	58
8th	89	96	0	54	0	0	100	92	94	81	17	84	39	79	61	84	9	96
9th	79	77	21	0	0	0	43	52	64	48	57	57	75	74	46	35	14	41
10th	100	89	0	0	0	0	50	0	0	0	40	53	90	95	80	0	5	19
	Average percent repellency																	
First 4 days	94	95	89	96	65	65	68	83	[1] 52	[1] 71	[1] 15	[1] 59	84	83	75	60		
Last 4 days	85	91	17	2	0	0	55	68	56	47	6	74	53	78	51	36		
Total—8 days	90	93	63	56	10	0	63	77	[2] 54	[2] 58	[2] 12	[2] 67	73	81	66	49		

[1] 3 days average.
[2] 7 days average.

TABLE 2.—*Percent repellency to* Amblyomma americanum *of materials tested at dosages of 1 ounce and 2 ounces per uniform*

Test days (by number of day after treatment)	N-n-butylacetanilide				1-Benzyl cyclohexanol-l				2-Phenyl cyclohexanol				Benzyl benzoate				6-2-2 mixture				Control: Average ticks per man on untreated uniforms	
	1 Ounce		2 Ounces		1 Ounce		2 Ounces		1 Ounce		2 Ounces		1 Ounce		2 Ounces		1 Ounce		2 Ounces			
	Percent repellency																					
	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs
3d	99	95	97	100	57	76	94	99	94	94	90	99	74	0	76	68	53	53	82	81	34	101
4th	96	98	100	99	79	92	100	99	88	99	100	99	73	80	71	78	31	88	0	61	26	204
5th	86	99	100	100	80	94	98	99	96	91	98	99	88	90	92	95	74	92	0	75	25	171
6th	96	100	100	100	100	98	98	97	42	56	56	92	23	74	96	95	21	73	67	86	24	133
7th	83	91	83	99	92	92	89	97	44	48	63	78	67	68	33	79	50	67	67	76	18	75
10th	76	95	100	99	62	73	47	67	35	43	65	98	----	----	----	----	----	----	----	----	17	41
11th	87	90	96	100	43	65	78	92	48	58	76	56	----	----	----	----	----	----	----	----	23	89
12th	94	96	95	81	55	76	61	91	80	35	64	57	----	----	----	----	----	----	----	----	33	70
13th	89	96	91	94	8	19	44	52	72	65	84	80	----	----	----	----	----	----	----	----	32	81
14th	67	90	89	96	0	0	22	24	67	69	44	63	----	----	----	----	----	----	----	----	9	49
	Average percent repellency																					
First 5 days	93	97	97	99	79	92	96	98	76	84	83	96	66	68	76	84	47	79	35	76	----	----
Last 5 days	86	93	94	94	28	46	54	69	64	54	71	68	----	----	----	----	----	----	----	----	----	----
Total—10 days	90	96	96	98	55	77	77	89	70	74	77	87	----	----	----	----	----	----	----	----	----	----

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In the 8 days of wear in the first series of tests (table 1), 90 percent or greater protection from ticks was given by 2-ounce impregnations as follows: butylacetanilide afforded protection from adults and nymphs on 5 test days; benzyl cyclohexanol—adults on 1 test day, nymphs on 4 test days; phenylcyclohexanol—adults on 1 test day, nymphs on 2 days; benzyl benzoate on 1 and 3 days; 6–2–2 and dibutyl phthalate on 1 and 1 days; dimethyl phthalate on 2 and 1 days; and phthalic acid-hexahydro-diethyl ester on 2 and 2 days. The highest average protection throughout the 8-day test period was obtained from butylacetanilide. Benzyl cyclohexanol, while giving higher average protection than the remaining materials during the first 4 days of wear, gave considerably lower average protection against both adults and nymphs than dimethyl phthalate and slightly lower average protection against nymphs than benzyl benzoate for the entire period. Phenyl cyclohexanol afforded the lowest average protection during the 8 days of wear.

In the 10 days of wear in the second series (table 2), 90 percent or greater protection was afforded against adults and nymphs respectively, with a dosage of 2 ounces, by butylacetanilide on 8 and 9 test days; benzyl cyclohexanol on 4 and 7 days; phenyl cyclohexanol on 3 and 5 days; and benzyl benzoate (5-day observation) on 2 and 2 days. With a dosage of 1 ounce: butylacetanilide on 4 and 10 test days; benzyl cyclohexanol on 2 and 4 days; phenyl cyclohexanol on 2 and 3 days; benzyl benzoate (5-day observation) on 0 and 1 days; 6-2-2 (5 day-observation) on 0 and 1 days. Butylacetanilide provided the highest average protection throughout 10 days of wear. Benzyl cyclohexanol gave a higher average protection than the remaining materials during the first 5 days and, at a dosage of 2 ounces, for the entire period. Phenyl cyclohexanol, while unexplainably deficient in the first series, afforded a higher average protection than benzyl benzoate and 6-2-2 for the first 5 days and, at a dosage of 1 ounce, higher average protection for the 10 days than benzyl cyclohexanol.

It is apparent that all materials afforded a somewhat higher degree of protection against nymphs than adults (tables 1 and 2). However, in the first series, benzyl cyclohexanol, phenyl cyclohexanol, and phthalic acid-hexahydro-diethyl ester showed a higher average protection from adults, but only subsequent to their marked reduction in effectiveness; i. e., after 4, 3, and 3 days respectively. From table 2 it is indicated that a dosage of 2 ounces gave greater protection than 1 ounce, with the exception of 6-2-2 of which the results were too erratic to be of much significance.

DISCUSSION

All materials tested gave some degree of protection. From the standpoint of maximum repellency it is at once apparent that butylacetanilide and benzyl cyclohexanol consistently rate first and second respectively in all tests.

From a comparison of the tabulated data it will be noted (1) that reasonably consistent results were obtained from butylacetanilide throughout both series of tests, (2) that this compound gave adequate to excellent protection against both nymphs and adults of *Amblyomma americanum* at dosages of both 1 and 2 ounces for 10 days of wear, and (3) that the end-point for persistence of its effectiveness was apparently not reached.

The data for the first series of tests suggest that benzyl cyclohexanol and phenyl cyclohexanol, while somewhat inconsistent in performance, were promising. In the second series both chemicals, at a dosage of 2 ounces, were almost equally as effective as butylacetanilide for the first few days of wear, but the effectiveness of benzyl cyclohexanol was greatly reduced after the fifth day and that of phenyl cyclohexanol after the third day.

Phthalic acid-hexahydro-diethyl ester, which showed promise of affording adequate protection up to 3 days, was not available for further testing.

In the first series, benzyl benzoate and dimethyl phthalate, while having given reasonable protection from nymphs, were quite erratic in their performance against adults, and in the second series, insofar as observed, the results from benzyl benzoate were compatible with those of the first. Both materials in the first tests were more persistent in effectiveness than benzyl cyclohexanol and phenyl cyclohexanol.

Dibutyl phthalate and the 6-2-2-mixture provided insufficient protection and were erratic in performance in all tests.

As noted in an earlier report (*loc. cit.*) butylacetanilide does not stain fabrics and does not have an objectionable odor. Although no data are available on its toxicity, the related compounds N-n-ethylacetanilide and N-n-propylacetanilide have been tested by the United States Food and Drug Administration and pronounced safe from the standpoint of irritation to the skin. Furthermore, there was no evidence of dermatitis or other objectionable reaction among 29 persons wearing garments or socks impregnated with this compound.

Where the impregnation of clothing by use of solvents is not feasible, treatment may be accomplished equally as well, and also more economically, by use of aqueous emulsions. Laboratory tests have shown that 5 percent emulsions of butylacetanilide in 1-percent solutions of sodium oleate, Tween 80, Triton X-500, Triton 720, or Triton 770, or in a 2-percent solution of laundry soap do not break

after several weeks standing, hence are sufficiently stable for practical purposes. Clothing dipped in an emulsion of this concentration takes up the amount of repellent required to provide adequate protection.

INCIDENTAL OBSERVATIONS ON N-N-BUTYLACETANILIDE AGAINST MITES

Occasional observations suggested that butylacetanilide affords complete protection from our two common species of man-infesting chiggers, *Eutrombicula alfreddugesi* and *E. masoni*. Although no controlled tests were performed, it was noted that the larvae of these mites when placed on impregnated clothing appeared to be immobilized in 4 to 10 seconds, often more rapidly than they could be brought into the focus of a lens.

While on a field assignment in western Arkansas, after leaving Camp Bullis, the writer was exposed to moderate populations of all stages of the lone star tick and very heavy chigger populations for 8 days. Only trousers and socks were treated with butylacetanilide. No tick or chigger bites were received during the period.

CONCLUSIONS

Butylacetanilide, having shown excellent repellency against both nymphs and adults of *Amblyomma americanum* for 10 days, is the best of the materials tested from the standpoint of maximum repellency, highest average protection, persistence of effectiveness and consistent performance. Its value for practical application as a tick repellent is strongly indicated, while incidental observations have suggested that it affords complete protection against chiggers. No data are available on its toxicity, but related compounds have been pronounced safe, and in tests described here on 29 persons no objectionable reactions were found.

Benzyl cyclohexanol and phenyl cyclohexanol, while less persistent in effectiveness, gave evidence of adequate protection for 5 and 3 days, respectively. Their possible usefulness is suggested.

Although erratic in performance and not giving the desired amount of protection, the use of benzyl benzoate and dimethyl phthalate, especially in the absence of the more promising compounds (both materials being readily available) is suggested.

Because of insufficient protection or erratic performance, or both, the use of dibutyl phthalate and the 6–2–2 mixture is not indicated.

INCIDENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED FEBRUARY 21, 1948

Summary

For the third consecutive week a decline was reported in the incidence of influenza—from 12,418 to 11,234 cases for the current week, as compared with 3,459 for the corresponding week last year and 4,472 for the median of the corresponding weeks of the years 1943–1947. The 9 States reporting currently 10,133 cases (90 percent, last week 11,180 cases), are as follows (last week's figures in parentheses): *Increases*—Alabama 589 (537), Arkansas 575 (491), Washington 832 (57), Oregon 635 (300), California 1,420 (1,234); *decreases*—Virginia 556 (1,237), South Carolina 1,059 (1,065), Texas 3,834 (5,087), Arizona 633 (1,172). Only 3 other States reported more than 98 cases—Georgia 178 (last week 26), Tennessee 146 (last week 107), and Louisiana 124 (last week 50). The total for the year to date is 83,183, as compared with 31,258 for the 5-year median, 27,425 for the same period last year, which was the lowest number recorded for a corresponding period of the past 5 years, and 294,840, the highest, in 1944.

Of 31 cases of poliomyelitis reported for the week (same week last year 43, 5-year median 33), Florida reported 4 (last week 4), and New York, Ohio, and California 3 each. The total for the year to date is 253, as compared with 449 for the same period last year (the highest in the past 5 years), and a 5-year median of 288.

Two cases of smallpox were reported—1 each in Louisiana and Colorado. Of 7 cases of anthrax, Pennsylvania reported 3, New Jersey 2, and Connecticut and New York 1 each. New York reported 2 cases of leprosy and California 1 case, and Illinois and North Carolina each reported 1 case of Rocky Mountain spotted fever. Reports for the year to date are above the median expectancies for the dysenteries (combined), influenza, measles, Rocky Mountain spotted fever, and undulant fever.

Deaths registered during the week in 93 large cities of the United States totaled 10,655, as compared with 10,032 last week 9,741 and 9,474, respectively, for the corresponding weeks of 1947 and 1946, and a 3-year (1945–47) median of 9,474. For the 8-week period ended February 21, the total is 83,951, as compared with 79,778 for the corresponding period last year. Infant deaths totaled 776, as compared with 670 last week and a 3-year median of 594. The total to date is 5,816, as compared with 6,581 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended February 21, 1948, and comparison with corresponding week of 1947 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that although none was reported cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median, 1943–47	Week ended—		Median, 1943–47	Week ended—		Median, 1943–47	Week ended—		Median, 1943–47
	Feb. 21, 1948	Feb. 15, 1947		Feb. 21, 1948	Feb. 15, 1947		Feb. 21, 1948	Feb. 15, 1947		Feb. 21, 1948	Feb. 15, 1947	
NEW ENGLAND												
Maine	0	6	1	1	3	2	3	309	14	0	1	1
New Hampshire	0	0	0	------	2	------	------	11	9	0	0	0
Vermont	0	1	1	------	------	------	------	124	94	0	0	0
Massachusetts	8	12	5	------	------	------	754	634	462	6	3	7
Rhode Island	0	1	0	------	------	------	1	141	16	0	0	0
Connecticut	0	1	0	------	2	4	58	626	320	3	0	2
MIDDLE ATLANTIC												
New York	12	17	15	[1] 11	[1] 12	[1] 7	1,563	133	1,102	12	9	32
New Jersey	1	3	3	12	5	12	1,257	125	425	3	1	6
Pennsylvania	3	10	10	([2])	[2] 3	[2] 4	972	516	1,080	2	8	21
EAST NORTH CENTRAL												
Ohio	14	14	10	7	7	11	1,077	532	154	2	4	6
Indiana	10	17	15	23	8	34	438	35	175	1	2	6
Illinois	1	3	9	1	1	5	2,649	50	506	3	6	16
Michigan [3]	3	8	7	3	1	2	1,495	260	260	6	3	5
Wisconsin	4	5	3	58	54	56	506	154	328	3	0	5
WEST NORTH CENTRAL												
Minnesota	3	5	4	------	------	------	338	63	48	2	1	3
Iowa	1	4	4	3	------	------	562	30	47	2	2	4
Missouri	4	6	6	10	8	5	204	4	212	1	2	7
North Dakota	1	2	1	------	30	10	34	1	3	0	1	1
South Dakota	0	3	3	------	------	------	10	6	66	0	1	0
Nebraska	0	4	3	2	------	26	28	3	82	2	0	1
Kansas	4	5	6	29	3	9	6	3	333	2	0	4
SOUTH ATLANTIC												
Delaware	0	0	0	------	------	------	42	3	8	2	0	1
Maryland [3]	7	4	6	11	4	8	63	37	75	1	1	4
District of Columbia	0	0	0	------	2	2	96	13	48	0	0	2
Virginia	2	10	10	556	490	559	78	245	257	2	3	7
West Virginia	3	6	5	82	41	29	191	95	37	0	0	2
North Carolina	7	14	12	------	------	------	------	478	254	0	2	7
South Carolina	5	1	2	1,059	426	687	95	43	43	1	0	5
Georgia	6	5	5	178	20	139	34	127	127	1	1	1
Florida	11	7	5	25	10	10	97	4	23	0	1	2
EAST SOUTH CENTRAL												
Kentucky	7	11	8	3	------	10	41	15	15	3	1	4
Tennessee	2	2	5	146	25	101	133	27	125	3	1	6
Alabama	3	1	7	589	43	188	196	25	28	6	2	4
Mississippi [3]	7	7	6	54	------	------	66	------	------	0	0	4
WEST SOUTH CENTRAL												
Arkansas	6	4	5	575	69	145	128	34	60	1	1	2
Louisiana	1	1	7	124	6	[2] 21	206	23	84	8	0	4
Oklahoma	4	5	5	84	147	[2] 248	[2] 1	3	41	5	3	4
Texas	25	25	38	3,834	1,761	2,043	1,435	100	379	5	3	13
MOUNTAIN												
Montana	0	0	0	27	26	25	110	256	248	0	0	0
Idaho	13	0	1	19	[1] 4	------	22	5	53	0	0	0
Wyoming	0	1	1	------	[1] 6	6	61	10	19	0	0	0
Colorado	3	10	7	98	140	83	136	45	191	1	2	2
New Mexico	1	5	2	9	[1] 1	2	17	38	21	0	1	0
Arizona	20	4	3	633	64	144	13	64	22	0	0	0
Utah [3]	0	0	0	80	13	57	33	8	82	0	0	0
Nevada	0	0	0	1	------	------	------	------	1	0	0	0
PACIFIC												
Washington	1	4	4	832	1	1	164	27	215	0	2	4
Oregon	0	4	4	635	5	28	27	57	84	0	0	2
California	4	30	30	1,420	16	103	660	238	621	9	4	19
Total	207	288	288	11,234	3,459	4,472	16,100	5,780	13,932	98	72	281
7 weeks	1,602	2,166	2,186	83,183	27,425	31,258	75,116	29,870	53,474	601	588	1,697
Seasonal low week [4]	(27th) July 5–11			(30th) July 26–Aug. 1			(35th) Aug. 30–Sept. 5			(37th) Sept. 13–19		
Total since low	7,960	9,732	10,776	126,741	60,400	61,160	110,062	52,757	79,598	1,383	1,560	3,646

[1] New York city only.
[2] Philadelphia only.
[3] Period ended earlier than Saturday.
[4] Dates between which the approximate low week ends. The specific date will vary from year to year.

Telegraphic morbidity reports from State health officers for the week ended February 21, 1948, and comparison with corresponding week of 1947 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1943–47	Week ended—		Median 1943–47	Week ended—		Median 1943–47	Week ended—		Median 1943–47
	Feb. 21, 1948	Feb. 15, 1947		Feb. 21, 1948	Feb. 15, 1947		Feb. 21, 1948	Feb. 15, 1947		Feb. 21, 1948[3]	Feb. 15, 1947	
NEW ENGLAND												
Maine	0	0	0	6	13	28	0	0	0	0	0	1
New Hampshire	0	0	0	2	0	8	0	0	0	0	0	0
Vermont	0	0	0	1	11	11	0	0	0	0	0	0
Massachusetts	0	0	0	125	177	312	0	0	0	0	2	2
Rhode Island	0	0	0	6	18	17	0	0	0	0	0	0
Connecticut	0	0	0	33	36	72	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	3	2	2	338	338	507	0	0	0	1	2	2
New Jersey	2	1	0	80	109	139	0	0	0	1	0	1
Pennsylvania	0	0	0	276	259	318	0	0	0	4	4	4
EAST NORTH CENTRAL												
Ohio	3	1	0	395	364	364	0	0	0	3	2	2
Indiana	0	2	1	93	124	124	0	1	1	1	2	2
Illinois	1	0	0	148	150	272	0	0	0	0	3	2
Michigan[3]	0	4	0	172	121	134	0	0	0	0	0	0
Wisconsin	0	1	0	72	68	210	0	0	0	0	1	0
WEST NORTH CENTRAL												
Minnesota	0	1	0	45	51	62	0	0	0	0	0	0
Iowa	0	2	0	49	53	60	0	0	1	0	0	0
Missouri	0	0	0	54	38	82	0	0	0	0	1	1
North Dakota	0	0	0	6	15	15	0	0	0	0	0	0
South Dakota	0	0	0	0	17	17	0	0	0	0	0	0
Nebraska	0	0	0	12	52	54	0	1	0	0	0	0
Kansas	2	1	0	40	71	89	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	8	12	9	0	0	0	0	0	0
Maryland[3]	0	1	0	48	34	83	0	0	0	0	0	0
District of Columbia	0	1	0	16	13	24	0	0	0	0	0	0
Virginia	0	0	0	19	43	53	0	0	0	3	1	2
West Virginia	0	0	0	46	24	47	0	0	0	1	0	0
North Carolina	1	1	1	33	34	47	0	0	0	0	2	2
South Carolina	1	0	0	4	8	8	0	0	0	0	1	0
Georgia	1	0	1	13	23	21	0	0	0	0	1	1
Florida	4	0	0	25	9	9	0	0	0	2	2	2
EAST SOUTH CENTRAL												
Kentucky	1	0	1	32	38	62	0	0	0	0	0	1
Tennessee	1	2	0	37	48	73	0	0	0	2	1	2
Alabama	2	2	1	18	17	22	0	0	0	0	0	1
Mississippi[3]	0	0	1	5	16	16	0	1	1	1	1	1
WEST SOUTH CENTRAL												
Arkansas	0	0	0	8	1	13	0	0	1	3	0	1
Louisiana	1	1	0	4	5	6	1	0	0	0	1	2
Oklahoma	1	2	0	8	10	17	0	0	0	1	0	1
Texas	1	1	2	36	45	83	0	0	1	2	3	4
MOUNTAIN												
Montana	0	0	0	20	7	8	0	0	0	0	0	0
Idaho	0	0	0	0	14	14	0	0	0	0	2	0
Wyoming	0	0	0	4	10	10	0	0	0	0	0	0
Colorado	1	0	0	22	48	57	1	0	0	0	1	0
New Mexico	1	0	0	2	5	15	0	0	0	0	0	0
Arizona	0	0	0	9	7	17	0	0	0	0	0	0
Utah[3]	0	1	0	22	15	71	0	0	0	0	0	0
Nevada	0	0	0	0	2	0	0	0	0	0	0	0
PACIFIC												
Washington	1	2	2	47	45	45	0	0	0	0	0	0
Oregon	1	0	0	32	45	40	0	0	0	0	3	1
California	3	13	9	65	135	235	0	1	0	0	2	2
Total	31	43	33	2,536	2,798	4,038	2	4	11	25	38	64
7 weeks	252	449	288	15,513	17,837	26,048	22	27	65	273	292	356
Seasonal low week[4]	(11th) Mar. 15–21			(32d) Aug. 9–15			(35th) Aug. 30–Sept. 5			(11th) Mar. 15–21		
Total since low	10,463	25,246	13,650	38,052	44,523	64,369	43	81	148	3,682	3,820	4,995

[3] Period ended earlier than Saturday.
[4] Dates between which the approximate low week ends. The specific date will vary from year to year.
[5] Including paratyphoid fever reported separately, as follows: Virginia 2.

Telegraphic morbidity reports from State health officers for the week ended February 21, 1948, and comparison with corresponding week of 1947 and 5-year median—Con.

Division and State	Whooping cough			Week ended Feb. 21, 1948							
	Week ended—		Median 1943–47	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	Feb. 21, 1948	Feb. 15, 1947		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	5	17	17				1				
New Hampshire		5									
Vermont	51	7	23		1						
Massachusetts	62	179	142		5						3
Rhode Island	12	29	23								
Connecticut	31	40	40								1
MIDDLE ATLANTIC											
New York	137	135	221	10	10		2			1	2
New Jersey	64	87	87	1							
Pennsylvania	106	178	178								
EAST NORTH CENTRAL											
Ohio	107	134	128	1							1
Indiana	42	37	24				1		1		1
Illinois	57	100	96	2	2		4	1			4
Michigan [3]	115	226	97	6	1						1
Wisconsin	102	148	82								4
WEST NORTH CENTRAL											
Minnesota	21	12	22		1						
Iowa	6	17	17								12
Missouri	23	15	14			2					4
North Dakota	14	5	2								
South Dakota	1	1	2								2
Nebraska	3	9	14								1
Kansas	32	13	27							1	
SOUTH ATLANTIC											
Delaware		10	5								
Maryland [3]	20	60	49								2
District of Columbia		8	8								1
Virginia	62	86	38			87					2
West Virginia	16	20	29								
North Carolina	32	42	89					1	3		
South Carolina	99	22	38	1	3		1				
Georgia	8	16	16						1		2
Florida	10	17	19	1						4	3
EAST SOUTH CENTRAL											
Kentucky	16	30	30						1	1	1
Tennessee	56	32	32	1					3		2
Alabama	47	5	9	3					1		
Mississippi [3]	3			5					1	1	
WEST SOUTH CENTRAL											
Arkansas	24	15	15	2		1			1		3
Louisiana	25		7	2					3	2	
Oklahoma	11	4	4	1		1					
Texas	332	332	313	6	143	69			1	9	12
MOUNTAIN											
Montana	15	6	6								
Idaho	8	5	5								1
Wyoming	9	1	1						1		
Colorado	92	7	21								1
New Mexico	15	31	9		1						
Arizona	50	29	16			8					
Utah [3]	53		16								2
Nevada											
PACIFIC											
Washington	14	25	37	2							
Oregon	18	17	17	3							4
California	69	96	97	3	10						1
Total	2,095	2,310	2,310	50	177	168	9	2	17	19	75
Same week: 1947	2,310			65	299	99	5	1	36	34	95
Median, 1943–47	2,310			25	220	73	9	1	9	37	[4] 77
6 weeks: 1948	15,743			403	2,041	1,834	53	5	153	116	646
1947	17,038			327	2,690	1,479	47	2	334	341	634
Median, 1943–47	16,017			192	2,239	873	54	2	155	386	[4] 510

[3] Period ended earlier than Saturday. [4] 3-year median 1945–47.

Anthrax: Connecticut 1, New York 1, New Jersey 2, Pennsylvania 3.
Leprosy: New York 2, California 1.
Alaska: Chickenpox, 3 cases.
Territory of Hawaii: Leprosy 2, measles 1, scarlet fever 1, whooping cough 24.

WEEKLY REPORTS FROM CITIES *

City reports for week ended February 14, 1948

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	-------	0	5	0	5	0	0	12
New Hampshire:												
Concord	0	0	------	0	-------	0	1	0	0	0	0	------
Vermont:												
Barre	0	0	------	0	-------	0	0	0	0	0	0	------
Massachusetts:												
Boston	2	0	------	0	239	1	5	0	24	0	0	7
Fall River	0	0	------	0	-------	1	1	0	1	0	0	5
Springfield	0	0	------	0	2	0	2	0	2	0	0	------
Worcester	0	0	------	0	1	0	5	0	11	0	0	6
Rhode Island:												
Providence	0	0	------	0	-------	0	1	0	6	0	0	4
Connecticut:												
Bridgeport	0	0	------	0	-------	0	0	0	7	0	0	2
Hartford	1	0	------	0	2	0	1	0	2	0	0	1
New Haven	0	0	1	0	-------	1	1	0	0	0	0	10
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	1	1	1	3	0	10	0	0	7
New York	10	1	8	3	593	5	61	2	73	0	1	21
Rochester	0	0	------	0	1	2	2	0	8	0	0	2
Syracuse	0	0	------	0	8	0	0	0	20	0	0	16
New Jersey:												
Camden	2	0	------	0	1	0	1	0	2	0	0	------
Newark	0	0	1	0	35	0	2	0	8	0	0	5
Trenton	3	0	2	0	2	0	4	0	4	0	0	------
Pennsylvania:												
Philadelphia	1	0	3	0	136	0	19	0	56	0	1	12
Pittsburgh	0	0	1	1	1	1	7	0	16	0	0	7
Reading	0	0	------	0	6	0	0	0	6	0	0	5
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	15	0	13	0	11	0	0	6
Cleveland	0	0	1	0	5	1	11	0	36	0	0	18
Columbus	0	0	------	0	193	0	5	0	9	0	0	12
Indiana:												
Fort Wayne	0	0	1	0	2	0	3	0	3	0	0	------
Indianapolis	0	1	------	0	136	0	4	0	10	0	0	10
South Bend	0	0	------	0	-------	0	0	0	3	0	0	2
Terre Haute	1	0	------	0	53	0	1	0	2	0	0	------
Illinois:												
Chicago	1	0	------	0	527	0	30	0	45	0	0	39
Springfield	0	0	------	0	159	0	2	0	0	0	0	2
Michigan:												
Detroit	2	0	------	1	52	2	6	0	56	0	0	38
Flint	0	0	------	0	1	0	2	0	3	0	0	------
Grand Rapids	0	0	------	0	472	0	3	0	4	0	0	2
Wisconsin:												
Kenosha	0	0	------	0	83	0	0	0	0	0	0	------
Milwaukee	0	0	------	0	14	0	2	0	8	0	0	17
Racine	0	0	1	1	88	0	1	0	1	0	0	1
Superior	0	0	------	0	6	0	0	0	3	0	0	------
WEST NORTH CENTRAL												
Minnesota:												
Duluth	1	0	------	0	1	0	2	0	2	0	0	5
Minneapolis	0	0	------	0	183	0	4	0	20	0	0	7
St. Paul	0	0	------	0	16	0	7	0	3	0	0	1
Missouri:												
Kansas City	0	0	4	1	6	0	14	0	3	0	0	20
St. Joseph	0	0	------	0	-------	1	0	0	2	0	0	------
St. Louis	0	0	2	0	48	0	13	0	20	0	0	6

*In some instances the figures include nonresident cases.

City reports for week ended February 14, 1948—Continued

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
North Dakota:												
Fargo	0	0	------	0	11	0	0	0	0	0	0	2
Nebraska:												
Omaha	0	0	------	0	8	0	2	1	0	0	0	------
Kansas:												
Topeka	0	0	------	0	1	0	0	0	1	0	0	------
Wichita	0	0	------	0	1	0	0	0	2	0	0	7
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	29	0	1	0	1	0	0	------
Maryland:												
Baltimore	0	0	3	1	4	1	14	0	3	0	0	11
Cumberland	1	0	------	0	------	0	1	0	1	0	0	------
District of Columbia:												
Washington	0	0	1	1	91	1	10	0	14	0	2	8
Virginia:												
Richmond	0	0	------	1	2	0	0	0	0	0	0	4
Roanoke	0	0	------	0	------	0	0	0	0	0	0	------
West Virginia:												
Charleston	0	0	------	0	------	0	6	0	0	0	0	------
Wheeling	0	0	------	0	6	0	0	0	0	0	0	------
North Carolina:												
Raleigh	0	0	------	0	------	0	0	0	0	0	0	------
Wilmington	0	0	------	0	------	0	2	0	0	0	0	6
Winston-Salem	1	0	------	0	------	0	2	0	0	0	0	------
South Carolina:												
Charleston	1	0	69	0	------	0	1	0	0	0	0	1
Georgia:												
Atlanta	0	0	13	0	------	0	8	0	6	0	0	------
Brunswick	0	0	------	0	------	0	0	0	0	0	0	------
Savannah	0	0	2	0	1	0	1	0	1	0	0	1
Florida:												
Tampa	0	1	1	1	35	1	3	0	0	0	0	4
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	1	56	1	12	0	0	0	0	6
Nashville	0	0	------	0	1	1	4	0	5	0	0	------
Alabama:												
Birmingham	0	0	4	1	------	0	4	0	0	0	0	1
Mobile	0	0	7	2	------	2	3	0	0	0	0	------
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	6	0	1	0	1	0	4	0	0	------
Louisiana:												
New Orleans	1	0	5	0	------	2	12	0	0	0	1	4
Shreveport	0	0	------	0	------	0	6	0	1	0	0	------
Oklahoma:												
Oklahoma City	1	0	2	0	------	0	2	0	2	0	0	------
Texas:												
Dallas	0	0	------	0	2	0	0	0	6	0	0	2
Galveston	0	0	------	0	------	0	2	0	0	0	0	------
Houston	1	0	1	0	28	1	4	0	1	0	1	2
San Antonio	0	0	3	4	3	0	12	0	2	0	1	------
MOUNTAIN												
Montana:												
Billings	0	0	------	0	------	0	2	0	0	0	0	2
Great Falls	0	0	------	0	2	0	2	0	0	0	0	------
Helena	0	0	------	0	------	0	0	0	0	0	0	------
Missoula	0	0	------	0	------	0	0	0	0	0	0	------
Colorado:												
Denver	0	0	------	0	75	0	3	0	6	0	0	29
Pueblo	1	0	------	0	------	0	1	0	0	0	0	1

City reports for week ended February 14, 1948—Continued

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	0	0	-----	0	7	1	4	0	12	0	0	4
Spokane	0	0	1	0	2	0	3	0	0	0	0	-----
Tacoma	0	0	-----	0	61	0	0	0	5	0	0	3
California:												
Los Angeles	0	0	45	3	28	1	5	0	13	0	0	15
Sacramento	0	0	2	1	1	1	0	0	3	0	0	1
San Francisco	0	0	52	1	122	3	17	0	4	0	0	8
Total	31	3	242	25	3,666	30	394	3	607	0	7	430
Corresponding week, 1947[1]	93	-----	93	16	970	-----	334	-----	701	0	5	683
Average 1943–47[1]	79	-----	235	[2] 32	[3] 3,735	-----	[2] 445	-----	1,324	1	10	628

[1] Exclusive of Oklahoma City.
[2] 3-year average, 1945–47.
[3] 5-year median, 1943–47.

***Rates** (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (latest available estimated population, 34,389,800)*

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	7.8	0.0	2.6	0.0	638	7.8	57.5	0.0	152	0.0	0.0	123
Middle Atlantic	7.4	0.5	6.9	2.3	363	4.2	45.8	0.9	94	0.0	0.9	35
East North Central	2.4	0.6	1.8	1.2	1,098	0.6	50.5	0.0	118	0.0	0.0	89
West North Central	2.0	0.0	11.9	2.0	547	2.0	83.6	2.0	105	0.0	0.0	95
South Atlantic	5.0	1.7	148.0	6.6	279	5.0	81.5	0.0	43	0.0	3.3	58
East South Central	0.0	0.0	64.9	23.6	336	23.6	135.7	0.0	83	0.0	0.0	41
West South Central	7.6	0.0	43.2	10.2	86	7.6	99.1	0.0	41	0.0	7.6	20
Mountain	11.1	0.0	0.0	0.0	855	0.0	88.9	0.0	67	0.0	0.0	355
Pacific	0.0	0.0	158.1	7.9	350	9.5	45.9	0.0	59	0.0	0.0	49
Total	4.7	0.5	36.8	3.8	557	4.6	59.9	0.5	92	0.0	1.1	65

Anthrax.—Cases: Trenton 1, Wilmington, Del. 1.
Dysentery, amebic.—Cases: New York 5, Chicago 1, Flint 1, St. Louis 1, Memphis 1, Dallas 1.
Dysentery, bacillary.—Cases: Worcester 4, Providence 3, St. Louis 1.
Dysentery, unspecified.—Cases: San Antonio 3.
Rocky Mountain spotted fever.—Cases: New Orleans 1.
Tularemia.—Cases: Baltimore 1, Atlanta 1, Memphis 1, New Orleans 1.
Typhus fever, endemic.—Cases: Kansas City, 1

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended January 31, 1948.—During the week ended January 31, 1948, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		20	4	202	555	93	68	51	92	1,085
Diphtheria				10	2	2	3	1		18
German measles				10	80	8	1	5	7	111
Influenza		40			9				13	62
Measles		6	3	795	938	8	19	11	53	1,833
Meningitis, meningococcus	1				1	1	1		2	6
Mumps		40		233	438	51	52	29	29	872
Poliomyelitis						2		2	1	5
Scarlet fever		2	11	46	87	3	2	10	15	176
Tuberculosis (all forms)		6	6	160	14	27	10	7	26	256
Typhoid and paratyphoid fever				12		1				13
Undulant fever					2					2
Venereal diseases:										
Gonorrhea	2	8	13	139	90	28	42	63	100	485
Syphilis	2	15	5	78	63	9	11	13	41	237
Whooping cough		3		41	37	15	5	75	23	199

CUBA

Habana—Communicable diseases—4 weeks ended January 31, 1948.—During the 4 weeks ended January 31, 1948, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chickenpox	4		Scarlet fever	3	
Diphtheria	21	1	Tuberculosis	7	
Malaria	3		Typhoid fever	10	1
Measles	6	1	Typhus fever (murine)	1	1
Poliomyelitis	1				

Provinces—Notifiable diseases—4 weeks ended January 31, 1948.—During the 4 weeks ended January 31, 1948, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana[1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	2	26	12	16	3	21	80
Chickenpox		17					17
Diphtheria		26		1		4	31
Hookworm disease		21					21
Leprosy		5				1	6
Malaria	12	3		4	12	13	44
Measles		7	1	24	2		34
Poliomyelitis	1	2		1		1	5
Scarlet fever		4					4
Tuberculosis	19	12	11	33	9	46	130
Typhoid fever	6	13	2	8	5	11	45
Typhus fever (murine)		1				1	2
Whooping cough		37					37

[1] Includes the city of Habana.

FINLAND

Notifiable diseases—December 1947.—For the month of December 1947, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	17	Poliomyelitis	17
Diphtheria	409	Scarlet fever	226
Dysentery	2	Syphilis	330
Gonorrhea	1,092	Typhoid fever	61
Paratyphoid fever	349		

GUAM

Encephalitis, Japanese "B".—Under date of February 24, 1948, an outbreak of Japanese "B" encephalitis was reported in Guam, with date of onset as December 1, 1947. Up to February 11, 1948, 44 cases had occurred, most of them being among the native population. During the week ended February 6, 1948, 13 cases were reported.

JAMAICA

Notifiable diseases—4 weeks ended January 31, 1948.—During the 4 weeks ended January 31, 1948, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	3	20	Poliomyelitis		1
Diphtheria	7	3	Puerperal sepsis		1
Dysentery	1	3	Tuberculosis (pulmonary)	47	52
Erysipelas	1		Typhoid fever	6	95
Leprosy	1	1			

JAPAN

Notifiable diseases—5 weeks ended January 31, 1948.—During the 5 weeks ended January 31, 1948, certain notifiable diseases were reported in Japan as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	2,065	236	Pneumonia	17,451	
Dysentery, unspecified	144	41	Scarlet fever	286	2
Gonorrhea	17,699		Smallpox	2	0
Influenza	469		Syphilis	15,332	
Malaria	267	0	Tuberculosis	21,350	
Measles	3,380		Typhoid fever	553	58
Meningitis, epidemic	160	38	Typhus fever	96	9
Paratyphoid fever	187	8	Whooping cough	3,627	

NOTE.—The above figures have been adjusted to include delayed and corrected reports.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during recent months. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Plague

Burma.—For the week ended January 31, 1948, 50 cases of plague with 35 deaths were reported in Burma.

Indochina (French)—Annam State.—For the period January 21–31 1948, 40 cases of plague with 7 deaths were reported in Annam State, French Indochina.

Portugal—Azores Islands—Ponta Delgada.—For the week ended January 17, 1948, 1 suspected case of plague was reported in the port area of Ponta Delgada, Azores Islands, Portugal. The last case previously reported in the Azores was for the week ended September 20, 1947 and occurred in the same locality.

Rhodesia (Northern)—Mankoya District—Barotseland.—For the week ended February 14, 1948, 5 cases of plague with 2 deaths were reported in Barotseland, Mankoya District, Northern Rhodesia. These are the first cases reported in Northern Rhodesia since 1944.

Siam Thailand.—For the week ended January 24, 1948, 18 cases of plague with 4 deaths were reported in Siam.

Smallpox

Siam Thailand.—For the week ended January 24, 1948, 57 cases of smallpox with 3 deaths were reported in Siam, including 30 cases in Bangkok.

DEATHS DURING WEEK ENDED FEBRUARY 14, 1948

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended Feb. 14, 1948	Corresponding week, 1947
Data for 93 large cities of the United States:		
Total deaths	10,032	10,007
Median for 3 prior years	10,007	
Total deaths, first 7 weeks of year	73,296	70,037
Deaths under 1 year of age	670	826
Median for 3 prior years	665	
Deaths under 1 year of age, first 7 weeks of year	5,040	5,796
Data from industrial insurance companies:		
Policies in force	66,861,796	67,302,666
Number of death claims	10,735	10,354
Death claims per 1,000 policies in force, annual rate	8.4	8.0
Death claims per 1,000 policies, first 7 weeks of year, annual rate	10.0	9.6

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FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF PUBLIC HEALTH METHODS

G. ST. J. PERROTT, *Chief of Division*

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It contains (1) current information regarding the incidence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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